It is claimed:

1. An apparatus for frequency control of a resonator, the resonator adapted to provide a first signal having a resonant frequency, the apparatus comprising:

an amplifier coupleable to the resonator; and

a frequency controller coupled to the amplifier and coupleable to the resonator, the frequency controller adapted to modify the resonant frequency in response to at least one variable of a plurality of variables.

2. The apparatus of claim 1, wherein the plurality of variables comprise temperature, fabrication process, voltage, and frequency.

3. The apparatus of claim 1, wherein the amplifier further comprises a negative transconductance amplifier.

4. The apparatus of claim 3, wherein the frequency controller is further adapted to modify a current through the negative transconductance amplifier in response to temperature.

5. The apparatus of claim 4, wherein the frequency controller further comprises a current source responsive to temperature.

6. The apparatus of claim 5, wherein the current source has one or more configurations selected from a plurality of configurations, the plurality of configurations comprising CTAT, PTAT, and $PTAT^2$ configurations.

7. The apparatus of claim 3, wherein the frequency controller is further adapted to modify a current through the negative transconductance amplifier to select the resonant frequency.

8. The apparatus of claim 3, wherein the frequency controller is further adapted to modify a transconductance of the negative transconductance amplifier to select the resonant frequency.

9. The apparatus of claim 14, wherein the frequency controller is further adapted to modify a current through the negative transconductance amplifier in response to a voltage.

10. The apparatus of claim 3, wherein the frequency controller is further adapted to modify a transconductance of the negative transconductance amplifier in response to fabrication process variation.

11. The apparatus of claim 3, wherein the frequency controller is further adapted to modify a current through the negative transconductance amplifier in response to fabrication process variation.

12. The apparatus of claim 1, wherein the frequency controller further comprises a voltage isolator coupled to the resonator and adapted to substantially isolate the resonator from a voltage variation.

13. The apparatus of claim 12, wherein the voltage isolator comprises a current mirror.

14. The apparatus of claim 13, wherein the current mirror has a cascode configuration.

15. The apparatus of claim 1, wherein the resonator is selected from a group comprising: an inductor (L) and a capacitor (C) configured to form an LC-tank resonator; a ceramic resonator, a mechanical resonator, a microelectromechanical resonator, and a film bulk acoustic resonator.

16. An apparatus, comprising:

a resonator, the resonator adapted to provide a first signal having a resonant frequency;

a negative transconductance amplifier coupled to the resonator; and

a temperature compensator coupled to the negative transconductance amplifier and to the resonator, the temperature compensator adapted to modify the resonant frequency in response to temperature.

17. The apparatus of claim 16, wherein the temperature compensator is further adapted to modify a current through the negative transconductance amplifier in response to temperature.

18. The apparatus of claim 17, wherein the temperature compensator further comprises a current source responsive to temperature.

19. The apparatus of claim 18, wherein the current source further comprises:

a first transistor;

a second transistor coupled to the first transistor;

a diode coupled to the first transistor; and

a resistor coupled to the second transistor.

20. The apparatus of claim 19, wherein the current provided by the current source is a function of a voltage across the diode and a resistance of the resistor, wherein the voltage and the resistance are temperature-dependent.

21. The apparatus of claim 19, wherein the first and second transistors are operable in strong inversion.

22. The apparatus of claim 18, wherein the current source further comprises:

a first transistor;

a second transistor coupled to the first transistor; and

a resistor coupled to the second transistor.

23. The apparatus of claim 22, wherein the current provided by the current source is a function of a voltage across the resistor, a resistance of the resistor, and respective sizes of the first and second transistor, wherein the voltage and the resistance are temperature-dependent.

24. The apparatus of claim 22, wherein the first and second transistors are operable at a subthreshold voltage.

25. The apparatus of claim 18, wherein the current source further comprises:
a plurality of transistors; and
a resistor coupled to a transistor of the plurality of transistors.

26. The apparatus of claim 25, wherein the current provided by the current source is a function of a square of a voltage across the resistor, wherein the voltage is temperature-dependent.

27. The apparatus of claim 25, wherein a first set of transistors of the plurality of transistors are operable in strong inversion and a second set of transistors of the plurality of transistors are operable at a subthreshold voltage.

28. The apparatus of claim 18, wherein the current source has one or more configurations selected from a plurality of configurations, the plurality of configurations comprising CTAT, PTAT, and $PTAT^2$ configurations.

29. The apparatus of claim 18, wherein the current source is coupled though one or more current mirrors to the negative transconductance amplifier.

30. An apparatus, comprising:
a resonator, the resonator adapted to provide a first signal having a resonant frequency;

a negative transconductance amplifier coupled to the resonator;

a current mirror coupled to the negative transconductance amplifier; and

a current source coupled to the current mirror, the current source adapted to modify the resonant frequency by varying a current through the current mirror and the negative transconductance amplifier in response to temperature.

31. The apparatus of claim 30, wherein the current source has one or more configurations selected from a plurality of configurations, the plurality of configurations comprising CTAT, PTAT, and $PTAT^2$ configurations.

32. The apparatus of claim 31, further comprising a plurality of current sources coupled to the current mirror, the a plurality of current sources having at least two configurations selected from a plurality of configurations, the plurality of configurations comprising CTAT, PTAT, and $PTAT^2$ configurations.